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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,061	01/10/2006	Koichi Sakamoto	281994US0PCT	3965
22850 7590 06/13/2008 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
SHEVIN, MARK L				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
06/13/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/564,061

Applicant(s)

SAKAMOTO ET AL.

Examiner

Mark L. Shevin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 8-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on 10 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-856)
Paper No(s)/Mail Date 01/10/2006 and 10/09/2007
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Status

1. Claims 1-20, filed as a preliminary amendment on January 10th, 2006, are pending.

Restriction

2. Claims 1-7 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction requirement in the reply filed on April 18, 2008.

The traversal is on the grounds that distinctiveness between the inventions and a search burden have not been shown. This is not found persuasive because neither of these are requirements in a 371 "lack of unity" restriction..

The requirement is still deemed proper and is therefore made FINAL.

Priority

3. Applicants claims to priority of Japanese patent application 2004-014693 (filed January 22nd, 2004), 2004-193558 (filed June 30th, 2004), and 2004-290513 (filed October 1st, 2004) have been recorded.

Information Disclosure Statements

4. The information disclosure statements submitted January 10th 2006 and October 9th 2007 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner. Please refer to applicants' copies of the 1449 forms submitted herewith.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 8-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over

JP '068 (JP 63-140068) in view of **JP '647** (JP 2002-167647), **JP '497** (JP 2002-194497) and **JP '184** (JP 2003-027184).

JP '068

JP '068, drawn to producing high-cleanliness spring steel products with excellent fatigue characteristics by reducing the inclusions in the steel, teaches a spring steel with the following alloy and inclusion oxides compositions (all wt% unless noted, Abstract):

Element or Compound	JP '068	Instant Application	Overlap
C	0.5-0.8	0-1.2	0.5-0.8
Si	1-4	0.1-4	1-4
Mn	0.5-1.5	0.1-2	0.5-1.5
Al	0.0001-0.5	0-0.1	0.0001-0.1

Mg	0.1-20 ppm	0.1-15 ppm	0.1-15 ppm
Ca	0.1-20 ppm	0.1-40 ppm	0.1-20 ppm
CaO	0-50	15-55	15-50
SiO ₂	25-75	20-70	25-70
Al ₂ O ₃	0-35	0-35	0-35
MgO	0-40	0-20	0-20

JP '068 teaches that these compositions in a steel product produce low melting point oxide inclusions that are reduced in sectional area during hot rolling and produces a steel with good resistance to permanent set along with excellent fatigue strength (Abstract).

JP '068 does not teach the presence of lithium or limiting inclusions to less than 20 μm using a 50 gram sample.

JP '647

JP '647, drawn to providing a Si-killed steel with a minimum number of large inclusions that has excellent fatigue strength, teaches that inclusions can be made ductile by including an alkaline metal such as Na, K, or Li in the form of R₂O (para 0012). When this alkaline oxide is added to a SiO₂ system, the surface energy of the inclusions are reduced and fatigue strength of the steel is thus increased (para 0013).

JP '647 hit on the idea that an added alkaline oxide will be advantageous in making SiO₂ inclusions distributed as minute particles (para 0025). The alkaline oxide should be present in the inclusion between 0.5 and 10 wt% (Abstract).

JP '497

JP '497, drawn to providing a Si-killed steel by refining with a slag including an alkaline metal oxide such as Li_2O (Abstract), teaches that the amount of oxide inclusion and the total oxygen content can be reduced by controlling the slag composition (para 0011). Decrease in the total oxygen content decreases wide inclusions and an improvement in fatigue characteristics and processability are expectable (para 0022).

Alkaline metal oxides such as Na_2O , K_2O , or Li_2O show strong basic nature and reduce the activity of SiO_2 when mixed together as a slag (para 0014), in effect working to refine the slag itself. These alkaline metal oxides are added in the form of carbonates (para 0037 and 0054).

JP '184

JP '184, drawn to providing a high-strength steel wire rod having excellent cold wire drawability by minimizing inclusions, teaches that this is accomplished by having less than 1 inclusion with a diameter greater than 20 μm per 50 g of the wire rod (Abstract).

As hard inclusions such as alumina comes from the refractories used in the manufacturing process, evaluation of their content by simple cross-sectional analysis (number per area) is not sufficient; instead inclusions should be more accurately measured by number per volume or weight of material (para 0004).

The acid dissolution, X-ray microanalyser (EPMA) method where the number of inclusions are measured per 50 grams of material was introduced by JP 09-12500 A (para 0005).

Regarding claim 8, it would have been obvious to one of ordinary skill in ferrous metallurgy, at the time the invention was made, taking the disclosures of JP '068, JP '647, JP '497, and JP '184 as a whole, to incorporate the Li_2O content in the inclusion of JP '647 and inclusion size restriction and measurement method of JP '184 into JP '068 for the following reasons. JP '068 had disclosed a high-cleanliness steel for use in springs with excellent fatigue strength by controlling the oxide composition of the inclusions to render them less harmful after hot rolling while JP '647 further taught that by providing 0.5 - 10 wt% of an alkaline oxide such as Li_2O to the inclusion, the surface energy is decreased and the fatigue strength is further increased above prior art levels.

While JP '647 does not specifically provide the end Li concentration in the steel in ppm, one would reasonable expect a concentration overlapping the claimed range as the inclusion Li_2O content is in the range claimed in dependent claims 10 and 13.

JP '184 teaches that inclusions should more accurately characterized by the presence per unit weight of the steel, in particular 50 grams of the steel in question and that cold drawability (ductility) is increased by having less than 1 particle with a diameter of greater than 20 μm per 50 grams of material.

JP '497 serves to reinforce the relationship between the lithium content in the slag (and consequently in the inclusion) as controlling slag basicity to reduce the activity of SiO_2 and thus improve fatigue characteristics.

Regarding claims 9 and 11, the Li/Si and $\text{Li}_2\text{O}/\text{SiO}_2$ ratios represent a reflection of the original slag basicity in that these are analogous to the widely known CaO/SiO_2 ratios (JP '497) used in slag chemistry. JP '647 taught that the basicity of SiO_2 must be

controlled to form ductile inclusions and this is done through the addition of an alkaline metal oxide such as Li_2O (para 0012). Again in para 0057, the slag basicity must be controlled. Thus the prior art demonstrates slag basicity (and consequently the final Li / Si ratio) as a result effective variable and one of ordinary skill would be motivated to choose the instantly claimed ranges through process optimization as the prior art taught the basicity as the ductility of inclusions may be controlled as such.

Regarding claims 10, 12, and 13, as shown in the table above, JP '068 teaches CaO , SiO_2 , Al_2O_3 , and MgO contents that overlap the instantly claimed ranges and JP '647 taught Li_2O in the claimed range. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 14 and 15, as shown in the table above, JP '068 teaches C, Si, Mn, Al, Mg, and Ca contents that overlap the instantly claimed ranges while JP '647 and JP '497 teach that the oxygen content should be below 15 ppm (0.0015%). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In

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re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 16-20, JP '068 teaches a high-cleanliness steel composition with Cr, V, Nb, and Ti contents and with a balance of Fe as the composition is a steel and of course unavoidable impurities as are germane to refined steel.

Conclusion

-- Claims 8-20 (All elected) are rejected

-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

10-564,061
June 4th, 2008